

REMARKS

Amendments

Claim 1 is amended to incorporate the recitation of claim 4, now cancelled. Thus, claim 1 recites that the medium comprises water, one or more solubilizers, and ethanolamine.

In addition, claim 1 is amended to recite that the particles are mono-dispersed. This amendment is supported throughout the disclosure. See, for example, the Title.

As a result of the amendments to claim 1, claims 4 and 5 are cancelled. Claims 6, 17, 20, 21, 27, and 28 are amended to be consistent with the language of amended claim 1.

Claim 12 is amended to delete the parenthetical statement. Claim 19 is amended to correct an obvious grammatical error. Claims 20 and 21 are also amended to delete “the amine” as the Examiner suggested.

These amendments do not require further significant consideration by the Examiner and clearly reduce the number of issues for appeal by eliminating many grounds of rejection, as discussed below. Furthermore, the amendments place the application in condition for allowance. Entry of the amendments is respectfully requested.

Claim Objections

Claims 20 and 21 are also amended to delete “the amine” as the Examiner suggested. Withdrawal of the claimed objections is respectfully requested.

Rejection under 35 USC 103(a) in view of Teller et al. and Su

Claims 1, 5-19, and 21-28 are rejected as being obvious under 35 USC 103(a) in view of Teller et al. (EP 1 036 763) and Su (US 5,932,168).

This rejection is not applied against claim 4. As noted above, claim 1 is amended to incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Teller et al., Su and Anselmann et al.

Claim 2 is rejected as being obvious under 35 USC 103(a) in view of Teller et al. (EP 1 036 763), Su (US 5,932,168), and Anselmann et al. (US 6,302,926). This rejection is respectfully traversed.

This rejection is also not applied against claim 4. As noted above, claim 1 is amended to incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Teller et al. and Blizzard et al.

Claims 1, 4, and 6-28 are rejected as being obvious under 35 USC 103(a) in view of Teller et al. (EP 1 036 763) and Blizzard et al. (US 5,626,964).

In the rejection, it is asserted that Teller et al. disclose a process comprising many of the features of the claimed process. Since the Teller et al. document is in German and no English translation is provided, applicant's counsel can not comment on these assertions. If the rejection is maintained, counsel requests that the Examiner provide an English translation of Teller et al.

The disclosure of Teller et al. is discussed in applicants' specification at page 2, wherein it is stated that EP '763 discloses a process for production of colored and fluorescent polysilicic acid particles in which ammonia is used as the main component in a hydrolytic polycondensation.

It is acknowledged in the rejection that Teller et al. do not disclose the use of ethanolamine as a base in the polycondensation hydrolysis process. With regards to this aspect, the rejection relies on the disclosure of Blizzard et al.

Unlike the disclosure of Teller et al., Blizzard et al. is not directed to the production of production of polysilicic acid particles by hydrolytic polycondensation. Instead, Blizzard et al. disclose a radiation-curable silicone resin composition which is said to exhibit substantial abrasion resistance and which utilizes and Si-O-C bond in the structure of the resin network. The composition comprises the reaction product of:

(A) at least one multifunctional acrylate selected from multifunctional acrylate monomers and oligomers having a predetermined sum of methacrylate and acrylate groups;

(B) a predetermined quantity of a tetra-alkoxysilane;

(C) at least one amine alcohol having at least one nucleophilic nitrogen-bonded hydrogen atom and at least one hydroxyl group per molecule, wherein the hydroxyl group is condensable with a hydrolyzate formed from the tetra-alkoxysilane (B), and the amine alcohol is present in a quantity that defines a predetermined number of nucleophilic nitrogen-bonded

hydrogen atoms, the ratio of the predetermined number sum of acrylate and methacrylate groups to the predetermined number of nucleophilic nitrogen-bonded hydrogen atoms being at least about 1:1; and

(D) a quantity of water sufficient to cause hydrolysis and condensation of the tetraalkoxysilane (A) without gelling the combination of components (A)-(D) or causing a precipitate to form.

Thus, the disclosure of Blizzard et al. is directed to the formation of a radiation curable silicone resin from an amine alcohol, a tetralkoxysilane, and a multifunctional acrylate. The disclosure of Blizzard et al. is not directed to the formation of mono-dispersed polysilicic acid particles, and therefore provides no indication as to how or why one would modify a process for the production mono-dispersed polysilicic acid particles.

As can be seen from the description of the composition, the amount of the amine alcohol used is tied to the amount of multifunctional acrylate used. Specifically, the ratio of the predetermined number sum of acrylate and methacrylate groups from the multifunctional acrylate to the predetermined number of nucleophilic nitrogen-bonded hydrogen atoms from the amine alcohol is at least about 1:1. This is due to the fact that the function of the amine alcohol is to form a Michael adduct with the acrylate/methacrylate groups. See column 6, lines 13-28, column 6, lines 37-41, and column 7, lines 5-20.

Thus, the disclosure of Blizzard et al. teaches the use of an amine alcohol as an agent for forming a Michael adduct with a multifunctional acrylate. However, the Teller et al. reaction medium does not contain a multifunctional acrylate. Therefore, Blizzard et al. provide no suggestion of modifying the process of Teller et al. so as to use an amine alcohol in the reaction medium.

Additionally, in the rejection it is asserted that Blizzard et al. disclose the use pentaerythritol tetra-acrylate (see, e.g., Example 1), and that this compound is a ketone and therefore a solubilizer. However, Blizzard et al. do not employ pentaerythritol tetra-acrylate as a solubilizer, and one of ordinary skill in the art upon reading the disclosure of Blizzard et al. would not assume that this compound is a solubilizer. In the reaction medium of Blizzard et al., it is evident that the pentaerythritol tetra-acrylate acts as the multifunctional acrylate. In addition to forming a Michael adduct with the amine alcohol, the pentaerythritol tetra-acrylate, acting as part of the Michael adduct, will undergo copolymerization with the tetra-

alkoxysilane hydrolyzate, thereby resulting in the formation of the silicone resin, as opposed to mono-dispersed polysilicic acid particles. See, e.g., column 6, lines 54-62.

The rejection asserts that based on the disclosures of Teller et al. and Blizzard et al., ammonia and ethanolamine are functionally equivalent. However, nothing within the rejection indicates that either Teller et al. or Blizzard et al. teach that ammonia and ethanolamine are functionally equivalent. The process of Blizzard et al. is clearly different than that of Teller et al. resulting in a different product. The Blizzard et al. disclosure clearly does not suggest that the alcohol amines disclosed therein are equivalent to ammonia used in a completely different process, such as the process disclosed by Teller et al. Neither Teller et al. nor Blizzard et al. disclose that ammonia and ethanolamine are equivalent bases for any use particular use.

Further, it is noted that bases are not “equivalent” for the process of applicants’ claimed invention. See, for example, the results of applicants’ Example 1, presented in Table 1 at page 15 of the specification. While ethanolamine and ethylenediamine provided monodisperse particles, other amines like triethylamine, octylamine, and tetramethylammonium hydroxide did not.

As a final note, applicants disagree with the assertion that, merely because Teller et al. allegedly do not expressly disclose that their particles are porous, one can definitively conclude that the particles produced by Teller et al. are non-porous.

In view of the above remarks, it is respectfully submitted that the disclosure of Teller et al., taken alone or in combination with the disclosure by Blizzard et al., fails to render obvious applicants’ claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Teller et al., Blizzard et al. and Anselmann et al.

Claim 2 is rejected as being obvious under 35 USC 103(a) in view of Teller et al. (EP 1 036 763), Blizzard et al. (US 5,626,964), and Anselmann et al. (US 6,302,926). This rejection is respectfully traversed.

The disclosures of Teller et al. and Blizzard et al. are discussed above. Anselmann et al. disclose preparations comprising: (a) 70 to 95% by weight of monodisperse spherical oxide particles that have particle diameters of 10 nm - 10 µm, and (b) 30 to 5% by weight of

an essentially non-volatile binder in the form of a free-flowing powder of agglomerates having diameters of 1 μm - 500 μm . See column 2, lines 1-8.

Anselmann et al. also describe a two-stage process for preparing SiO_2 particles wherein first a sol or a suspension of primary particles is prepared by hydrolytic polycondensation of tetraalkoxysilanes in an aqueous-alcoholic-ammoniacal medium. Next, the particles are brought to a desired final size by metered addition of tetraalkoxysilane. See column 3, lines 3-8.

Anselmann et al. do not disclose a process wherein hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes is performed in a medium comprising water, one or more solubilizers, and an amine, namely ethanolamine. Nor do Anselmann et al. suggest metered addition of tetraalkoxysilane in a process involving hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes in the presence of ethanolamine.

As noted above, Anselmann et al. use an aqueous-alcoholic-ammoniacal medium which has several disadvantages as described in applicants' specification. See, e.g., page 2, lines 13-30.

Additionally, the disclosure of Anselmann et al. does not overcome the deficiencies in the combination of Teller et al. and Blizzard et al., as discussed above.

In view of the above remarks, it is respectfully submitted that the disclosure of Teller et al., taken alone or in combination with the disclosure by Blizzard et al. and/or Anselmann et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Trau et al. and Su

Claims 1, 5, 7, 8, 10-18, and 24-26 are rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564) and Su (US 5,932,168). This rejection is respectfully traversed.

This rejection is not applied against claim 4. As noted above, claim 1 is amended to incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Trau et al., Su and Anselmann et al.

Claim 2 is rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564), Su (US 5,932,168), and Anselmann et al. (US 6,302,926). This rejection is respectfully traversed.

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Rejection under 35 USC 103(a) in view of Trau et al., Su and Teller et al.

Claim 19 is rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564), Su (US 5,932,168), and Teller et al. (EP 1 036 763). This rejection is respectfully traversed.

This rejection is not applied against claim 4. As noted above, claim 1 is amended to incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Trau et al. and Blizzard et al.

Claims 1, 4, 6-8, 10-18, 20-21, and 24-28 are rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564) and Blizzard et al. (US 5,626,964).

The rejection refers to paragraphs [0010]-[0012] of Trau et al. In this portion of the disclosure, Trau et al. describe a method for synthesizing colloidal silica known as the Stober process. In this process, tetraethyl orthosilicate is subjected to hydrolysis in a solution of ethanol, water, and ammonia. The hydrolysis of tetraethyl orthosilicate forms reactive silanol groups, and the silanol groups condense to form a polymer chain. As the polymer chain increases, polymer solubility decreases and the polymer precipitates as colloidally unstable, nano-sized, silica particles. These particles are said to aggregate to form larger particles that are monodisperse.

Trau et al. also disclose that in the Stober process fluorescent dyes can be incorporated into the silica network via silane coupling agents, such as 3-aminopropyl trimethoxysilane. (APS), that react with isothiocyanate modified dyes to form fluorescent silane monomers.

At paragraph [0013], Trau et al. disclose disadvantages associated with the Stober

process. Trau et al. state that the particles obtained are limited to a maximum size of about 3 microns, and the resultant particles have limited porosities.

Trau et al. do not disclose a process wherein hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes is performed in a medium comprising water, one or more solubilizers, and an amine, namely ethanolamine.

The disclosure of Blizzard et al. is discussed above. Blizzard et al. is directed to the formation of a radiation curable silicone resin from an amine alcohol, a tetraalkoxysilane, and a multifunctional acrylate. Blizzard et al. is not directed to the formation of mono-dispersed polysilicic acid particles, and therefore provides no indication as to how or why one would modify a process for the production mono-dispersed polysilicic acid particles.

Furthermore, the disclosure of Blizzard et al. teaches the use of an amine alcohol as an agent for forming a Michael adduct with a multifunctional acrylate. However, the Trau et al. reaction medium does not contain a multifunctional acrylate. Therefore, Blizzard et al. provide no suggestion of modifying the process of Trau et al. so as to use an amine alcohol in the reaction medium.

Additionally, in the rejection it is asserted that Blizzard et al. disclose the use pentaerythritol tetra-acrylate (see, e.g., Example 1), and that this compound is a ketone and therefore a solubilizer. However, Blizzard et al. do not employ pentaerythritol tetra-acrylate as a solubilizer, and one of ordinary skill in the art upon reading the disclosure of Blizzard et al. would not assume that this compound is a solubilizer. In the reaction medium of Blizzard et al., it is evident that the pentaerythritol tetra-acrylate acts as the multifunctional acrylate. In addition to forming a Michael adduct with the amine alcohol, the pentaerythritol tetra-acrylate acting as part of the Michael adduct will undergo copolymerization the tetra-alkoxysilane hydrolyzate, thereby resulting in the formation of the silicone resin as opposed to mono-dispersed polysilicic acid particles. See, e.g., column 6, lines 54-62.

The rejection asserts that based on the disclosures of Trau et al. and Blizzard et al., ammonia and ethanolamine are functionally equivalent. However, nothing within the rejection indicates that either Trau et al. or Blizzard et al. teach that ammonia and ethanolamine are functionally equivalent. The process of Blizzard et al. is clearly different than that of Trau et al. resulting in a different product. The Blizzard et al. disclosure clearly does not suggest that the alcohol amine disclosed therein are equivalent too a base used in a

completely different process, such as the process disclosed by Trau et al. Neither Trau et al. nor Blizzard et al. disclose that ammonia and ethanolamine are equivalent bases for any use particular use.

Further, it is noted that bases are not “equivalent” for the process of applicants’ claimed invention. See, for example, the results of applicants’ Example 1, presented in Table 1 at page 15 of the specification. While ethanolamine and ethylenediamine provided monodisperse particles, other amines like triethylamine, octylamine, and tetramethylammonium hydroxide did not.

As a final note, applicants disagree with the assertion that, merely because Trau et al. allegedly do not expressly disclose that their particles are porous, one can definitively conclude that the particles produced by Trau et al. are non-porous. In fact, Trau et al. expressly disclose that their particles are **porous**. See, e.g., paragraphs [0021] and [0025].

In view of the above remarks, it is respectfully submitted that the disclosure of Trau et al., taken alone or in combination with the disclosure by Blizzard et al., fails to render obvious applicants’ claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Trau et al., Blizzard et al. and Anselmann et al.

Claim 2 is rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564), Blizzard et al. (US 5,626,964), and Anselmann et al. (US 6,302,926). This rejection is respectfully traversed.

The disclosures of Trau et al., Blizzard et al. and Anselmann et al. are discussed above. Anselmann et al. do not disclose a process wherein hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes is performed in a medium comprising water, one or more solubilizers, and an amine, namely ethanolamine. Nor do Anselmann et al. suggest metered addition of tetraalkoxysilane in a process involving hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes in the presence of ethanolamine.

As noted above, Anselmann et al. use an aqueous-alcoholic-ammoniacal medium which has several disadvantages as described in applicants’ specification. See, e.g., page 2, lines 13-30.

Additionally, the disclosure of Anselmann et al. does not overcome the deficiencies in the combination of Trau et al. and Blizzard et al., as discussed above.

In view of the above remarks, it is respectfully submitted that the disclosure of Trau et al., taken alone or in combination with the disclosure by Blizzard et al. and/or Anselmann et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Trau et al., Blizzard et al. and Teller et al.

Claim 19 is rejected as being obvious under 35 USC 103(a) in view of Trau et al. (US 2003/0124564), Blizzard et al. (US 5,626,964), and Teller et al. (EP 1 036 763). This rejection is respectfully traversed.

The disclosures of Trau et al., Blizzard et al., and Teller et al. are discussed above. In the rejection, it is asserted that it would be obvious to use the material from the combination of Trau et al. and Blizzard et al. in any of the applications recited in applicants' claim 19 "such as a solid phase for the investigation of molecular recognition phenomena as that taught by Teller et al."

Since the Teller et al. document is in German and no English translation is provided, applicant's counsel can not comment on this assertion. If the rejection is maintained, counsel requests that the Examiner provide an English translation of Teller et al.

In any event, the disclosure of Teller et al. does not overcome the deficiencies in the combination of Trau et al. and Blizzard et al., as discussed above.

In view of the above remarks, it is respectfully submitted that the disclosure of Trau et al., taken alone or in combination with the disclosure by Blizzard et al. and/or Teller et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Unger et al. and Su

Claims 1, 2, 5, 7-9, 17-19, and 22-23 are rejected as being obvious under 35 USC 103(a) in view of Unger et al. (US 4,775,520) and Su (US 5,932,168). This rejection is respectfully traversed.

This rejection is not applied against claim 4. As noted above, claim 1 is amended to

incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Unger et al., Su, and Trau et al.

Claims 10-16 and 24-26 are rejected as being obvious under 35 USC 103(a) in view of Unger et al. (US 4,775,520), Su (US 5,932,168), and Trau et al. (US 2003/0124564). This rejection is respectfully traversed.

This rejection is not applied against claim 4. As noted above, claim 1 is amended to incorporate the recitation of claim 4. Thus, this rejection is rendered moot by the amendment to claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Unger et al. and Blizzard et al.

Claims 1, 2, 5, 7-9, 17-19, and 22-23 are rejected as being obvious under 35 USC 103(a) in view of Unger et al. (US 4,775,520) and Blizzard et al. (US 5,626,964).

Firstly, it is noted that this rejection is not applied against claim 4. However, in light of the arguments presented and the citation of the Blizzard et al. reference, it appears that claim 4 was intended to be rejected as well. Thus, for the sake of furthering prosecution, applicants will assume that this rejection is applied to claim 4.

Unger et al. disclose a method for the preparation of spherical SiO₂ particles by hydrolytic polycondensation of tetralkoxysilanes in an aqueous/alcoholic ammoniacal medium. In a first step, a sol of primary particles is produced. Then, the SiO₂ particles obtained are converted to the desired size by a continuous measured addition of tetraalkoxysilane. See, for example, column 3, lines 5-16.

Unger et al. do not disclose a process wherein hydrolytic polycondensation of tetraalkoxysilanes and/or organotrialkoxysilanes is performed in a medium comprising water, one or more solubilizers, and ethanolamine.

The disclosure of Blizzard et al. is discussed above. Blizzard et al. is directed to the formation of a radiation curable silicone resin from an amine alcohol, a tetralkoxysilane, and a multifunctional acrylate. Blizzard et al. is not directed to the formation of mono-dispersed polysilicic acid particles, and therefore provides no indication as to how or why one would

modify a process for the production mono-dispersed polysilicic acid particles.

Furthermore, the disclosure of Blizzard et al. teaches the use of an amine alcohol as an agent for forming a Michael adduct with a multifunctional acrylate. However, the Unger et al. reaction medium does not contain a multifunctional acrylate. Therefore, Blizzard et al. provide no suggestion of modifying the process of Unger et al. so as to use an amine alcohol in the reaction medium.

Additionally, in the rejection it is asserted that Blizzard et al. disclose the use pentaerythritol tetra-acrylate (see, e.g., Example 1), and that this compound is a ketone and therefore a solubilizer. However, Blizzard et al. do not employ pentaerythritol tetra-acrylate as a solubilizer, and one of ordinary skill in the art upon reading the disclosure of Blizzard et al. would not assume that this compound is a solubilizer. In the reaction medium of Blizzard et al., it is evident that the pentaerythritol tetra-acrylate acts as the multifunctional acrylate. In addition to forming a Michael adduct, with the amine alcohol, the pentaerythritol tetra-acrylate, acting as part of the Michael adduct will undergo copolymerization with the tetra-alkoxysilane hydrolyzate, thereby resulting in the formation of the silicone resin as opposed to mono-dispersed polysilicic acid particles. See, e.g., column 6, lines 54-62.

The rejection asserts that based on the disclosures of Unger et al. and Blizzard et al., ammonia and ethanolamine are functionally equivalent. However, nothing within the rejection indicates that either Unger et al. or Blizzard et al. teach that ammonia and ethanolamine are functionally equivalent. The process of Blizzard et al. is clearly different than that of Unger et al. resulting in a different product. The Blizzard et al. disclosure clearly does not suggest that the alcohol amine disclosed therein are equivalent too a base used in a completely different process, such as the process disclosed by Unger et al. Neither Unger et al. nor Blizzard et al. disclose that ammonia and ethanolamine are equivalent bases for any use particular use.

Further, it is noted that bases are not “equivalent” for the process of applicants’ claimed invention. See, for example, the results of applicants’ Example 1, presented in Table 1 at page 15 of the specification. While ethanolamine and ethylenediamine provided monodisperse particles, other amines like triethylamine, octylamine, and tetramethyl-ammonium hydroxide did not.

In view of the above remarks, it is respectfully submitted that the disclosure of Unger

et al., taken alone or in combination with the disclosure by Blizzard et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Unger et al., Blizzard et al., and Trau et al.

Claims 10-16 and 24-26 are rejected as being obvious under 35 USC 103(a) in view of Unger et al. (US 4,775,520), Blizzard et al. (US 5,626,964), and Trau et al. (US 2003/0124564). This rejection is respectfully traversed.

The disclosures of Unger et al., Blizzard et al., and Trau et al. are discussed above. In the rejection, it is asserted that it would be obvious to modify the material from the combination of Unger et al. and Blizzard et al. to incorporate a fluorescent dye in view of the disclosure of Trau et al. However, the disclosure of Trau et al. does not overcome the deficiencies in the combination of Unger et al. and Blizzard et al., as discussed above.

In view of the above remarks, it is respectfully submitted that the disclosure of Unger et al., taken alone or in combination with the disclosure by Blizzard et al. and/or Trau et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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Date: September 17, 2009